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ART UNIT	PAPER NUMBER
2612	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/817,833	YUKAWA ET AL.
	Examiner	Art Unit	
	LUONG T. NGUYEN	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>25 July 2005</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Response to Arguments

1.   Applicant's arguments with respect to claims 1-5, 19 and newly added claim 21 filed on

7/25/2005 have been fully considered but they are not persuasive.

2.   Applicant's arguments with respect to claims 6-18 filed on 7/25/2005 have been

considered but are moot in view of the new ground(s) of rejection.

In re page 9, Applicant argues that Komiya fails to disclose that the taking lens is driven

in steps greater than a depth of field as required by claim 1.

In response, regarding claim 1, Applicant recited the limitation "a driver for driving a

taking lens in steps each producing movement of said taking lens through a distance greater than

a depth of field." The Examiner considers that Komiya does disclose this limitation. Komiya

discloses a driver (pulse motor 16, Figure 1, Column 2, Lines 20-25) for driving a taking lens

(photographing optical system 1, Figure 1, Column 1, Lines 35-45) in steps each produce

movement of said taking lens through a distance (the optical system 1 moves a distance Δx in

each sampling interval for a predetermined period of time, Figure 2, Column 3, Lines 2-6)

greater than a depth of field (it is noted that the depth of field is the region in both side of the

peak value Px (in-focus point, position α in Figures 2-3) where the photographing optical system

1 is in focus; P1 is under shoot position, the photographing optical system 1 is not in focus; P2 is

over shoot position, the photographing optical system 1 passes the in-focus point Px and P2 is

also not in focus; therefore, P1 and P2 are outside the region of the focus; therefore, the depth of

field must be a region between, but not including P1 and P2 in Figures 2-3. In order to obtain the

in-focus point, the photographing optical system 1 moves a distance Δx in each step from P0 to

P1 and then from P1 to P2; since the depth of field is a region somewhere between P1 and P2,

the photographing optical system 1 moves a distance Δx in each step inherently greater than the

depth of field).

Claim Objections

3.   Claims 6-18, 20 are objected to because of the following informalities:

Claim 6 (Line 11), claim 20 (Line 9), "an evaluation value" should be changed

to --the evaluation value--.

Claim 10 (Line 2), claim 11 (Line 4), claim 13 (Line 2), "said second driver" should be

changed to --said diaphragm driver--.

Claims 7-18 are objected as being dependent on claim 6.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

Claim 20 (Line 8) recites the limitation "said" in "said change". There is insufficient

antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.   Claims 1, 3-5, 19, 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Komiya

(U. S. Patent No. 5,115,262).

Regarding claim 1, Komiya discloses a digital camera comprising:

an imaging device (CCD 2, Figure 1, Column 1, Lines 40-60) including a

two-dimensional array of pixels for receiving an optical image of a subject to generate an image

signal;

a driver (pulse motor 16, Figure 1, Column 2, Lines 20-25) for driving a taking lens

(photographing optical system 1, Figure 1, Column 1, Lines 35-45) in steps each producing

movement of said taking lens through a distance (the optical system 1 moves a distance Δx in

each sampling interval for a predetermined period of time, Figure 2, Column 3, Lines 2-6)

greater than a depth of field (it is noted that the depth of field is the region in both side of the

peak value Px (in-focus point, position α in Figures 2-3) where the photographing optical system

1 is in focus; P1 is under shoot position, the photographing optical system 1 is not in focus; P2 is

over shoot position, the photographing optical system 1 passes the in-focus point Px and P2 is

also not in focus; therefore, P1 and P2 are outside the region of the focus; therefore, the depth of

field must be a region between, but not including P1 and P2 in Figures 2-3. In order to obtain the

in-focus point, the photographing optical system 1 moves a distance Δx in each step from P0 to

P1 and then from P1 to P2; since the depth of field is a region somewhere between P1 and P2,

the photographing optical system 1 moves a distance Δx in each step inherently greater than the

depth of field);

a calculator for calculating an evaluation value based on the image signal obtained from

said imaging device in each position to which said taking lens is driven (band-pass filter 9

extracts an image signal component of a specific frequency band and supplies the image signal to

gate 8, then gate 8 extracts only a signal component associated with a target in-focus region, the

signal is supplied to digital integrator 11 to output a focus signal value (evaluation value) to

microprocessor 7, Figure 1, Column 1, Line 62 through Column 2, Line 25);

processor for performing an interpolation process upon a plurality of evaluation values

obtained in respective positions to which said taking lens is driven to determine an in-focus

position of said taking lens (microprocessor 7 performs an interpolation processing upon a

plurality of focus signal f(x) obtained in respective positions to which the photographing optical

system 1 is moved to the in-focus point α (Figures 1-3, Column 2, Line 52 through Column 3,

Line10);

a controller (microprocessor 7 and motor driving circuit 15, Figure 1, Column 2, Lines

15-25) for controlling said driver to drive said taking lens to said in-focus position, based on a

processing result from said processor.

Regarding claim 3, Komiya discloses wherein said interpolation process is performed based on evaluation values prior to and after a maximum evaluation value (the interpolation process is performed based on focus signal value at point P1 (prior to a maximum value) and point P2 (after the maximum value, Figure 3, Column 2, Line 55 through Column 3, Line 5).

Regarding claim 4, Komiya discloses wherein said interpolation process determines said in-focus position by a steep inclination extension method (microprocessor 7 performs an interpolation process based on inclination extension method upon the focus signal values at points P0, P1, P2, Column 2, Lines 55-67, Figure 3).

Regarding claim 5, Komiya discloses wherein said evaluation value includes contrast (specific frequency component extracted by band-pass filter 5, Figure 1, Column 1, Lines 62-65) of said image signal.

Regarding claim 19, Komiya discloses a method of controlling autofocus, comprising the steps of:

receiving an optical image of a subject at an imaging device including a two-dimensional array of pixels to generate an image signal (CCD 2, Figure 1, Column 1, Lines 40-60);

driving a taking lens in steps each producing movement of said taking lens through a distance (pulse motor 16 drives photographing optical system 1 a distance Δx in each sampling interval for a predetermined period of time to the in-focus position, Figure 1, Column 1, Lines 35-45, Column 2, Lines 20-25, Figure 2, Column 3, Lines 2-6) greater than a depth of field (it is

noted that the depth of field is the region in both side of the peak value Px (in-focus point, position α in Figures 2-3) where the photographing optical system 1 is in focus; P1 is under shoot position, the photographing optical system 1 is not in focus; P2 is over shoot position, the photographing optical system 1 passes the in-focus point Px and P2 is also not in focus; therefore, P1 and P2 are outside the region of the focus; therefore, the depth of field must be a region between, but not including P1 and P2 in Figures 2-3. In order to obtain the in-focus point, the photographing optical system 1 moves a distance Δx in each step from P0 to P1 and then from P1 to P2; since the depth of field is a region somewhere between P1 and P2, the photographing optical system 1 moves a distance Δx in each step inherently greater than the depth of field);

calculating an evaluation value based on the image signal obtained from said imaging device in each position to which said taking lens is driven (band-pass filter 9 extracts an image signal component of a specific frequency band and supplies the image signal to gate 8, then gate 8 extracts only a signal component associated with a target in-focus region, the signal is supplied to digital integrator 11 to output a focus signal value (evaluation value) to microprocessor 7, Figure 1, Column 1, Line 62 through Column 2, Line 25);

performing an interpolation process upon a plurality of evaluation values obtained in respective positions to which said taking lens is driven to determine an in-focus position of said taking lens (microprocessor 7 performs an interpolation processing upon a plurality of focus signal f(x) obtained in respective positions to which the photographing optical system 1 is moved to the in-focus point α (Figures 1-3, Column 2, Line 52 through Column 3, Line10);

driving said taking lens to said determined in-focus position (microprocessor 7 send a

driving control signal to motor driving circuit 15 for moving the photographing optical system 1

to in-focus position, Figures 1-2, Column 2, Lines 15-25).

Regarding claim 21, all the limitations of claim 21 are contained in claim 1, except the

limitation "a focusing lens," which corresponds to limitation "a taking lens" recited in claim 1

and is disclosed as photographing optical system 1, Figure 1, Column 1, Lines 35-45 in Komiya.

Therefore, see Examiner's comments regarding claim 1.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

8.   Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komiya

(U. S. Patent No. 5,115,262) in view of Hirao et al. (U. S. Patent No. 5,077,613).

Regarding claim 2, Komiya fails to specifically discloses wherein said driver drives said

taking lens in steps each producing movement of said taking lens through a smaller distance than

said distance near said in-focus position. However, Hirao et al. teaches a video camera with

automatic focusing function, which comprises a stepping motor 9 for driving the group focusing

lens 1-4 to in-focus position; if the difference of focus value at the region near the focused point

is small, the driving speed of stepping motor is set to a small value (namely, the number of

pulses per unit time of the clock signal Ck is small), this means that the group focusing lens 1-4

moves a smaller distance at the region near the in-focus position (Figures1-2, Column 4, Lines

40-46). Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to modify the device in Komiya by the teaching of Hirao et al. in order to

provide a video camera which is simple in structure and automatically focusable always at a high

level of accuracy under various conditions of an object (Column 1, Lines 43-46).

9.   Claims 6-7, 10-11, 13, 18, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Komiya (U. S. Patent No. 5,115,262) in view of Okajima et al. (U. S. Patent No.

6,636,262).

Regarding claim 6, Komiya fails to specifically disclose a diaphragm driver for driving a

diaphragm having a variable aperture diameter; wherein the controller controls the diaphragm

driver so that said diaphragm is adjusted to a first aperture diameter smaller than a second

aperture diameter when calculating an evaluation value based on a captured image obtained from

said imaging device for at least two positions to which said taking lens is driven, thereby

determining a direction in which said taking lens is to be driven.

However, Okajima et al. teaches a diaphragm driver (iris driving circuit 14, Figure 1,

Column 3, Lines 38-40) for driving a diaphragm (iris 2, Figure 1, Column 3, Lines 14-26) having

a variable aperture diameter; wherein the controller (combination of elements 8, 9, 12, 13, Figure

1, Column 3, Lines 1- 62) controls the diaphragm driver so that said diaphragm is adjusted to a

first aperture diameter smaller than a second aperture diameter (Note that iris 2 is used to adjust

the quantity of light in the picture plane, and the aperture degree of iris 2 which corresponds to

aperture diameter is detected by diaphragm amount detecting circuit 11. The detected output of

diaphragm amount detecting circuit 11 is applied to a threshold value producing circuit 16, and a

threshold value according to the aperture degree of iris 2 is produced and applied to focus

evaluation value producing circuit 9. The threshold value producing circuit 16 sets a threshold

value according to the aperture degree of iris 2 if the aperture area of iris 2 is not more than the

prescribe value, Column 3, Lines 14-26) when calculating an evaluation value based on a

captured image obtained from said imaging device for at least two positions to which said taking

lens is driven, thereby determining a direction in which said taking lens is to be driven (note that

the focus evaluation value producing circuit 9 controls the driving of focus lens 1 in plurality of

positions and determines a direction of in which drives the focus lens 1 into the in-focus position,

Figure 1, Column 3, Lines 1-62).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to modify the device in Komiya by the teaching of Okajima et al. in order to

provide an autofocus apparatus which removes a high frequency component from the evaluation

value of an image having high luminance part, by excluding integration of high frequency

component in an area having a luminance level equal to higher than a prescribe value when the

entire picture plane is dark and the iris is considerably opened (Column 1, Lines 43-50).

Regarding claim 7, Okajima et al. discloses an exposure calculator (exposure evaluation

value producing circuit 8, Figure 1, Column 3, Lines 27-40) for performing an exposure

computation to calculate a proper aperture value for proper exposure of said imaging device,

wherein said second aperture diameter is determined by said proper aperture value (Column 3,

Lines 35-40).

Regarding claim 10, Okajima et al. discloses controller controls said second driver to

increase the aperture diameter of said diaphragm when said taking lens is driven to near an in-

focus position (Okajima et al. discloses the threshold value producing circuit 16 sets a prescribe

value as the threshold value if the aperture area of iris 2 is not less than the prescribed value; a

threshold value according the aperture degree of iris 2 is produced and applied to the focus

evaluation producing circuit 9 for generating a driving signal for driving focus lens 1 to near an

in-focus position, Figure 1, Column 3, Lines 14-24).

Regarding claim 11, Okajima et al. discloses a calculator for performing an exposure

computation to calculate a proper aperture value for proper exposure of said imaging device

(exposure evaluation value producing circuit 8, Figure 1, Column 3, Lines 27-40), wherein said

controller controls said second driver to adjust said diaphragm to a third aperture diameter

greater than the aperture diameter determined by said proper aperture value when said taking

lens is driven to near said in-focus position (Column 3, Lines 14-40).

Regarding claim 13, Okajima et al. discloses wherein said controller controls said second

driver to adjust said diaphragm to said first aperture diameter when the direction in which said

taking lens is to be driven is not determinable (Column 3, Lines 14-62).

Regarding claim 18, Okajima et al. discloses the evaluation value includes contrast

(luminance level, Column 3, Lines 55-62) of said image signal.

Regarding claim 20, claim 20 is equivalent to claim 6, therefore, see Examiner's

comments regarding claim 6.

10.   Claims 8-9, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komiya

(U. S. Patent No. 5,115,262) in view of Okajima et al. (U. S. Patent No. 6,636,262) further in

view of Parulski et al. (U. S. Patent No. 5,610,654).

Regarding claim 8, Komiya and Okajima et al. fail to specifically disclose an adjuster for

adjusting a gain of said image signal obtained by said imaging device, said adjuster increasing

said gain in accordance with a change in aperture diameter of said diaphragm which is made by

said controller. However, Parulski et al. teaches an automatic exposure control system for an

electronic camera, in which the gain is increased as the scene illumination decreases (Figure 1,

Column 1, Lines 48-60). Note that the aperture diameter of the diaphragm is used to adjust the

quantity of light; since the scene illumination decreases when the aperture diameter of the

diaphragm changes to smaller diameter, the gain is increased as the aperture diameter of the

diaphragm changes to smaller diameter.   Therefore, it would have been obvious to one of

ordinary skill in the art at the time the invention was made to modify the device in Komiya and

Okajima et al. by the teaching of Parulski et al. in order to provide an improved automatic

exposure control system for an electronic camera which uses a variable amplifier to amplify the

output signal of an image sensor (Column 1, Lines 48-51).

Regarding claim 9, Parulski et al. discloses an adjuster for adjusting charge storage time in said imaging device, said adjuster increasing said charge storage time in accordance with a change in aperture diameter of said diaphragm which is made by said controller (Parulski et al. discloses that it is desirable to shorten the exposure time, which corresponds to charge storage time, by increasing the shutter speed. Shorten exposure time, however, lessens the amount of incident light that reaches the image plane of the camera, which corresponds to reduce the aperture diameter of the diaphragm. This indicates that shortening the charge storage time is in accordance with the reduction of the aperture diameter of the diaphragm or increasing the charge storage time is in accordance with the increasing of the aperture diameter of the diaphragm).

Regarding claim 12, Parulski et al. discloses an adjuster for adjusting a gain of said image signal obtained by said imaging device, said adjuster decreasing said gain as said controller increases the aperture diameter of said diaphragm (Parulski et al. teaches an automatic exposure control system for an electronic camera, in which the gain is increased as the scene illumination decreases, Figure 1, Column 1, Lines 48-60. Note that the aperture diameter of the diaphragm is used to adjust the quantity of light; since the scene illumination decreases when the aperture diameter of the diaphragm changes to smaller diameter, the gain is increased as the aperture diameter of the diaphragm changes to smaller diameter. This also indicates that the gain is decreased as the aperture diameter of the diaphragm changes to larger diameter).

11.   Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komiya

(U. S. Patent No. 5,115,262) in view of Okajima et al. (U. S. Patent No. 6,636,262) further in view of Hashimoto (U. S. Patent No. 6,686,966).

Regarding claim 14, Komiya and Okajima et al. fails to specifically disclose the controller operates when receiving an instruction to capture an image. However, Hashimoto teaches an electronic imaging system, which includes operating switch 24 having a release switch for capturing an image (Figure 1, Column 6, Lines 8-17). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Komiya and Okajima et al. by the teaching of Hashimoto in order to capture an image.

Regarding claim 15, Hashimoto discloses controller operates when power to said digital camera is turned on (Column 6, Lines 8-17).

Regarding claim 16, Hashimoto discloses controller operates after said captured imaged is recorded (Column 6, Lines 8-17).

Regarding claim 17, Hashimoto discloses controller operates when a recording mode is selected (Column 6, Lines 8-17).

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

13. Any inquiry concerning this communication or earlier communications from the

examiner should be directed to LUONG T NGUYEN whose telephone number is (571) 272 -

7315. The examiner can normally be reached on 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, NGOCYEN VU can be reached on (571) 272 -7320. The fax phone number for the

organization where this application or proceeding is assigned is (571) 273 -8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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10/15/05

NGOC-YEN VU
PRIMARY EXAMINER